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does also the large parenchyma cells between the mestome and the stereome of the superior face. The leptome is enclosed by layers of very narrow cells and separated from the hadrome.  $\times 240$ . Fig. 10. Epidermis of the inferior face.  $\times 560$ . Figs. 11 and 12. Thorn-shaped expansions from the superior epidermis, seen from the side and from above.  $\times 240$ .

Figs. 13 and 14. *U. Palmeri*.—Fig. 13. Transverse section of leaf.  $\times 74$ . Fig. 14. Stomate from the inferior face, transverse section.  $\times 320$ .

## Notes on Uredineæ.

J. C. ARTHUR.

*Puccinia Stipæ* is variously cited by different writers. Dietel<sup>1</sup> writes *P. Stipæ* Opiz, and considers the American form, heretofore called *P. Stipæ* Arthur, identical with it. In Sydow's Uredineen, fascicle I, No. 28, it is given as *P. Stipæ* (Opiz) Hora, and is so spoken of by Magnus<sup>2</sup> in a notice of the publication.

Opiz<sup>3</sup> made use of the name in a list of Bohemian plants, in which no characterizations or notes of any kind are given. It was not used as a specific name, but for a sub-form of a variety of *P. Graminis*. The full name reads *Puccinia Graminis* Pers., c *foliorum* Opiz,  $\beta$  *Stipæ* Opiz. The host is not mentioned, but it was presumably a *Stipa*, and quite possibly *S. capillata*, on which the rust was gathered in 1888 by Paul Hora in the region covered by Opiz's list. Whether a description of the species has been published by Hora or not the writer does not know, but if so it probably did not antedate the publication in America.<sup>4</sup> The name correctly written would therefore be *Puccinia Stipæ* (Opiz) Arthur.

*Puccinia ornata* was first published as the name of a *Leptopuccinia* on *Rumex*<sup>5</sup> in 1887, and consequently the later application of the specific name to another *Puccinia* by Harkness<sup>6</sup> calls for correction. It would be a pleasure to dedicate this interesting form to the discoverer, if another

<sup>1</sup> Hedwigia, xxviii, (1889, p. 187).

<sup>2</sup> Hedwigia, xxviii, (1889, p. 94).

<sup>3</sup> Seznam Rostlin Kvetěny České, 1852, p. 138.

<sup>4</sup> Arthur, Preliminary List of Iowa Uredineæ, in Bull. Iowa Agric. Coll., Nov. 1884, p. 160.

<sup>5</sup> Report of botanical work in Minnesota, in Bull. No. 3, Geol. Surv. Minn., 1887, p. 30.

<sup>6</sup> Proc. Cal. Acad. Sci., 2nd. Ser., ii. 1889.

species of the genus did not already bear his name. The name **Puccinia medusæoides** is therefore proposed for it, from the resemblance of the branched pedicel of the teleutospores to that of Spegazzini's *P. Medusa*.

*Uromyces perigynius* has an error in the description as originally published in Journal of Mycology, v. p. 11, to which my attention has been directed by Mr. E. W. D. Holway. The measurements of the teleutospores, as there given, should be multiplied by three, making the true dimensions  $12-18 \times 24-30 \mu$ .

The teleutospores found upon the leaves do not, as a rule, have the apex long and pointed, but more or less rounded, and the spore correspondingly shorter.

Dietel<sup>7</sup> demonstrated that *Uromyces Caricis* Peck, is the uredo of a Puccinia, which he called *P. Caricis-strictæ* D., and remarked that no true *Uromyces* upon *Carex* is known. A month afterward *U. perigynius* Halst. was published, and it appears to be a true *Uromyces*. No mention in the original description is made of the uredo form, but I have received from Mr. E. W. D. Holway excellent material collected in August, 1887, upon the leaves of *Carex pubescens*, bearing both uredo- and teleutosori. The uredospores are globose, epispore thin and echinulate,  $15-18 \mu$  in diameter, with occasionally a spore measuring  $22-28 \mu$ . The uredospores possess two or three lateral germ-pores, while the teleutospores have a single terminal germ-pore. This pore is not easily demonstrated in most cases, even with the use of sulphuric acid. Any doubt of its presence, however, is put to rest by a specimen collected by the writer, in Indiana, upon a *Carex* that is probably *C. pubescens*. It was found in May upon the leaves of the preceding season's growth. Most of the teleutospores in this specimen have the terminal pore distinctly open, from having already germinated without dropping out of the sorus.

*Coleosporium Viburni* was established upon the uredo form alone. Teleutospores have since been gathered upon the same host, *V. Lentago*, at Racine, Wis., by J. J. Davis. The sori are hypophyllous, scattered, yellow; teleutospores cylindrical, or elongated clavate, three- or four-locular, smooth,  $20-30 \times 65-90 \mu$ .

**Puccinia Cyperi** n. sp.—Sori irregularly scattered upon effused brown spots on the culms and under surface of foliage

<sup>7</sup> Hedwigia, xxviii (1889), p. 22.

and involucre leaves, oblong, long covered with thick epidermis; uredospores elliptical or nearly round to obovate, epispore thin, echinulate,  $19-22 \times 20-30\mu$ ; teleutospores brown above and pale below, elongated oblong, little if any constricted, vertex strongly thickened, obtusely and obliquely pointed, epispore thin, smooth,  $17-20 \times 33 \times 63\mu$ ; pedicel short, one-third the length of the spore or less, slightly colored.

On *Cyperus Schweinitzii*: Iowa, E. W. D. Holway, J. C. Arthur; Nebraska, H. J. Webber, in *Flora of Nebraska*, No. 369; Wisconsin, W. Trelease and L. H. Pammel, in *Paras. Fungi of Wis.*, No. 202. On *Cyperus strigosus*: Michigan, J. C. Arthur.

This species is related to *P. obtecta*, and in the form of its teleutospores also resembles *P. Caricis*, to which it has been referred.

**Uromyces Gentianæ** n. sp.—Sori scattered over the green parts of the host, oblong or round, soon naked, brownish-yellow color; uredospores globose or ovoid, epispore thin, echinulate,  $18-20 \times 19-25\mu$ ; teleutospores globose or ovoid, yellowish-brown, vertex rounded, slightly thickened, epispore thin, obscurely papillate,  $15-19 \times 19-23\mu$ , pedicel fragile, very short.

On *Gentiana quinquefolia* var. *occidentalis*, Decorah, Iowa, E. W. D. Holway.

The teleutospores are almost the same size and color as the uredospores, and quite different from the one-celled teleutospores of *Puccinia Gentianæ*. That these are genuine teleutospores is certain from the presence of a terminal pore, which shows very distinctly upon using sulphuric acid. Their close resemblance to the uredospore has caused them to be overlooked heretofore. The uredospores are sometimes thickened like the teleutospores, but the spot is always lateral, and not terminal, and by using acid the two or three lateral pores can be made visible.

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